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EXAMINER

ALEJANDRO, RAYMOND

ART UNIT PAPER NUMBER

1745

DATE MAILED: 11/24/2003

11

Please find below and/or attached an Office communication concerning this application or proceeding.

020 11

| | | | |
|------------------------------|-------------------------------|--------------------------------|--|
| Office Action Summary | Application No. 10/017,483 | Applicant(s) WARDROP ET AL. | |
| | Examiner Raymond Alejandro | Art Unit 1745 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 November 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
 4a) Of the above claim(s) 8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 05 November 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner
 If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>9</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Response to Amendment

This office action is responsive to the amendment filed 11/05/03. The applicants have overcome the objections and the 35 USC 102 rejection. However, the claims are rejected again over art as seen below. Thus, the claims are finally rejected for the reasons of record.

Election/Restrictions

1. Applicant's cancellation of claims 10-20 in Paper No. 10 is acknowledged.
2. This application still contains claim 8 drawn to an invention nonelected with traverse in Paper No. 7. A complete reply to the final rejection must include cancelation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Drawings

3. The corrected or substitute drawings were received on 11/05/03. These drawings are approved.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keller et al 3850695 in view of European document EP-982788.

The instant claims are directed to a fuel cell stack assembly wherein the claimed inventive concept comprises the specific electrical controlling features. Other limitations include the second set of fuel cells; the load positioning; the capacitance; the inductance and the specific transistor.

Regarding claim 1:

Keller et al disclose a voltage regulator system for use with fuel cell battery (TITLE) wherein the fuel cell battery system comprises a load circuit 1 including a fuel cell battery 2 (COL 1, lines 55-60); transistor 43 and 64 (COL 5, lines 17-20/ COL 6, line 6-10); and the load 3 (COL 1, lines 59-63). It is further disclosed that the voltage regulator system for a load circuit energized by a fuel cell battery comprises control means 5 arranged to energize the electric motor (*another load coupled to the fuel cell system*) and monitoring means 4 responsive to the current drawn by the load circuit and having an output switch 33 adapted to be switched from a rest condition to an operated condition whenever a particular specific quantity of electricity has

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passed through said load (CLAIM 1); a circuit connected to said fuel cell battery 2 for supplying power to a load 3 including, a main switch between the fuel cell battery and the monitoring means, a measuring element 31 forming part of the monitoring means, and the switch path of an electrically controllable switch (CLAIM 1); means for supplying a control voltage necessary to make said switching path of the electrically controllable switch conducting initially in response to the closing thereof and to maintain the switching path conducting responsive to the condition of the portion of the load circuit on the load side of the electrically controllable switch, the voltage across said portion of said load circuit also serving as a supply voltage for activating elements of the monitoring means other than the measuring element thereof (CLAIM 1).

45 1. A voltage regulator system for a load circuit (1) energized by a fuel cell battery (2) comprising:
 a battery fuel storage tank (9);
 means including a pump (8) for supplying fuel from
 said tank to said battery;
 50 an electric motor (7) for driving said pump;
 control means (5) arranged to energize said electric motor;
 monitoring means (4) responsive to the current drawn by said load circuit and having an output
 55 switch (33) adapted to be switched from a rest condition to an operated condition whenever a particular specific quantity of electricity has passed through said load;
 a circuit connected to said battery (2) for supplying
 60 power to a load (3) including, in series, a main switch (13) between said battery (2) and said monitoring means (4), a measuring element (31) forming part of said monitoring means, and the switching path (14-15) of an electrically controllable
 65 switch (16);
 means for supplying a control voltage necessary to make said switching path (14-15) of said electrically controllable switch (16) conducting initially

in response to the closing of said main switch (13) and to maintain said switching path conducting in response to the condition of the portion of said load circuit (1) on the load side of said electrically controllable switch (16), the voltage across said
 5 portion of said load circuit also serving as a supply voltage for activating elements of said monitoring means other than said measuring element thereof; and
 connecting circuit means for causing said control
 10 means to activate said motor every time said output switch is switched to its operated condition, to reset said output switch to its rest condition and after an interval to deenergize said motor, said connecting circuit means including a monostable flip-
 15 flop (12) for producing control pulses, the duration of which determines the intervals during which said motor is energized and said pump is in operation.

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It is further disclosed that the output switch of the monitoring means is a voltage sensitive switch responsive to the voltage varying with the integrated value and adapted to switch to its operated condition when said varying voltage reaches a threshold value (CLAIM 11), in which further said particular quantity of electricity is determined by the threshold value of the varying voltage (CLAIM 11).

11. A voltage regulator system as defined in claim 1 in which said monitoring means (4) includes a measuring resistor (31) in series in said load circuit, in which further the voltage drop produced by the current through said measuring resistor is provided to an integrator (32), in which further said output switch (33) of said monitoring means (4) is a voltage sensitive switch responsive to the voltage varying with the integrated value as formed by said integrator (32) and adapted to switch to its operated condition when said varying voltage reaches a threshold value, in which further said particular specific quantity of electricity referred to in claim 1 is determined by said threshold value of said varying voltage, and in which a reset means (34) responsive to operation of said output switch (33) is provided in said monitoring means for resetting said integrator (32).

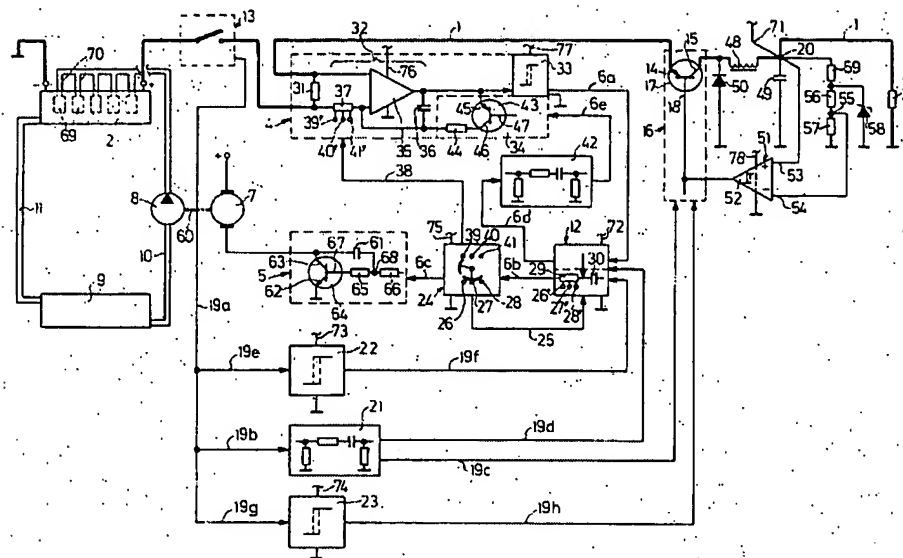
With respect to claim 2:

Keller et al disclose that the fuel cell battery comprises individual cells, which are connected by individual branches. This is feasible because it provides a fuel cell assembly without the occurrence of disturbing losses from bridging of the individual cell (COL 6, lines 24-35). *Thus, the second set of fuel cell and electrical features are inherently recited.*

On the matter of claims 3-4:

Figure 1 below gives a picture of a schematic diagram of a regulator system according to Keller et al's invention and shows the load is located upstream downstream from the fuel cell in an air flow communication therewith and proximate to the fuel cell.

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In reference to claim 5:

Keller et al teach several capacitors (COL 4, lines 1-5/ Col 5, lines 25-28 and lines 37-40/ CLAIMS 12 and 15-16).

As far as claim 6:

Keller et al teach an inductor (Col 5, lines 37-40/ CLAIM 15).

On the subject of claims 7 and 9:

Keller et al reveals the use of an npn transistor (COL 6, lines 6-10) as well as a pnp transistor (COL 2, line33-35/COL 5, lines 17-18).

Keller et al disclose a voltage regulator system for use with fuel cell batteries according to the aforementioned aspects. Nevertheless, Keller et al do not expressly disclose the fuel cells being made of a solid polymer.

The EP'788 document discloses fuel cells as a power source using solid polymer electrolyte (SECTION 0003 and 0005) and wherein the fuel cell system comprises an apparatus for safeguarding fuel cells against reverse polarization damage by monitoring the fuel cells in a

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stack thereof and alerting the stack's operator and/or initiating corrective measures to protect failing cells in the stack when undesirable stack operating conditions are indicated (SECTION 0001).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to use the solid polymer electrolyte fuel cell of the EP'788 document in the fuel cell system of Keller et al as the EP'788 discloses that fuel cells comprising solid polymer electrolyte has been used as a power source for many applications because they have high energy and low weight. Furthermore, the EP'788 directly teaches the use of solid polymer fuel cells for power source applications including safeguarding and monitoring the fuel cells to initiate corrective measures to protect failing cells when undesirable stack operating conditions are indicated. Consequently, the teachings of the EP'788 document are consistent with Keller et al's teaching of providing fuel cell detecting, monitoring and controlling features.

Response to Arguments

7. Applicant's arguments with respect to claims 1-7 and 9 have been considered but are moot in view of the new ground(s) of rejection.

8. Although not necessary due to the new ground of rejection, the examiner wants to state the following:

a) since or given that the '695 patent does not expressly disclose any specific fuel cell chemistry or electrolyte environment, it has been understood that the voltage regulator system of the '695 patent can be satisfactorily employed with any type of fuel cells because it is apparent from the teachings of the foregoing patent that the voltage regulator system is not chemically

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dependent or electrolytically dependent from the specific fuel cell chemistry and/or electrolyte environment. This is further valid because those of ordinary skill in the art would clearly envision to couple or use together voltage regulators or shunt regulating systems with fuel cells as these features/equipment are generally-conventionally separated or detached from each other so that their individual and particularized chemical environments does not necessarily interfere, affect or cause detrimental damages between them unless they are both integrally or internally manufactured, constructed, assembled or formed;

b) furthermore, the EP'788 directly teaches the use of solid polymer fuel cells for power source applications including safeguarding and monitoring the fuel cells to initiate corrective measures to protect failing cells when undesirable stack operating conditions are indicated. Consequently, the teachings of the EP'788 document are consistent with Keller et al's teaching of providing fuel cell detecting, monitoring and controlling features;

c) applicants have basically or essentially argued that the load feature of the '695 patent apparently do not have the same functionality as the disclosed but not claimed feature of the instant application, and thus, the overall monitoring and voltage regulation system of the prior art is not able to respond as presently claimed. In this regard, it is noted that the features upon which applicant relies (*i.e., the load including resistive element such as resistor for thermally dissipating excess power, or also including capacitive and/or inductive elements*) are not recited in the rejected claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Hence, the teachings of the prior art are fairly proportionate and commensurate, at least, to the instant claim language, since the resulting

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claim does not clearly set forth the metes and bounds of the patent protection desired. Unless applicants clearly differentiate the structure of the claimed fuel cell stack assembly from the structure of prior art fuel cell, it is contended that, for practical purposes, the fuel cell of the prior art is able to implement the defined requisite functionality to satisfy the claimed requirement.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (703) 306-3326. The examiner can normally be reached on Monday-Thursday (8:30 am - 7:00 pm).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (703) 308-2383. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Raymond Alejandro
Examiner
Art Unit 1745

STEPHEN KALAFUT
PRIMARY EXAMINER
GROUP 1700

